

#3

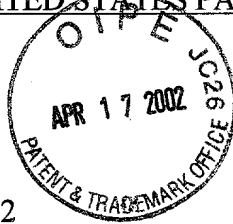
"PATENT"

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of
Kuchta et al.
Serial No. 10/066,221

Filed: January 31, 2002

For: Metallocene Compositions



§
§
§
§
§
§
§
§

BEFORE THE EXAMINER
unassigned
Group Art Unit No.
Paper No.

Case Docket No. 2000B039A/2
Baytown, Texas

April 8, 2002

Commissioner of Patents and Trademarks
Washington, D.C. 20231

AMENDMENT IN RESPONSE TO NOTICE TO FILE CORRECTED

APPLICATION PAPERS

Sir:

This amendment is in response to the Notice to File Corrected Application Papers
mailed March 25, 2002.

IN THE ABSTRACT

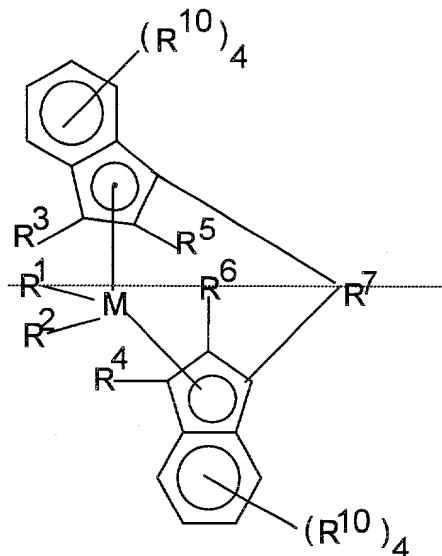
Please replace the abstract with the following replacement paragraphs. Marked-up
versions of the amended paragraphs are attached as APPENDIX A: "VERSION WITH
MARKING TO SHOW CHANGES MADE."

APPENDIX A

VERSION WITH MARKINGS TO SHOW CHANGES MADE

This invention relates to bridged indenyl metallocene compositions and their use in the preparation of catalyst systems for olefin polymerization, particularly propylene polymerization. The bridge may be represented by the formula:

In one embodiment, the metallocenes of the present invention may be represented by the formula:



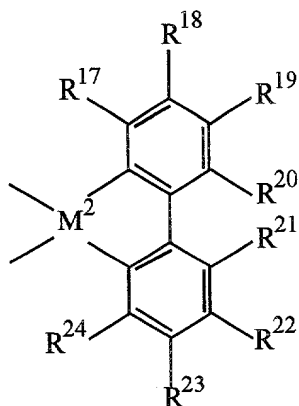
wherein: M is a metal of Group 4, 5, or 6 of the Periodic Table preferably, zirconium, hafnium and titanium, most preferably zirconium;

R^1 and R^2 are identical or different, preferably identical, and are one of a hydrogen atom, a C_1 - C_{10} alkyl group, preferably a C_1 - C_3 alkyl group, a C_1 - C_{10} alkoxy group, preferably a C_1 - C_3 alkoxy group, a C_6 - C_{10} aryl group, preferably a C_6 - C_8 aryl group, a C_6 - C_{10} aryloxy group, preferably a C_6 - C_8 aryloxy group, a C_2 - C_{10} alkenyl group, preferably a C_2 - C_4 alkenyl group, a C_7 - C_{40} arylalkyl group, preferably a C_7 - C_{10} arylalkyl group, a C_7 - C_{40} alkylaryl group, preferably a C_7 - C_{12} alkylaryl group, a C_8 - C_{40} arylalkenyl group, preferably a C_8 - C_{12} arylalkenyl group, or a halogen atom, preferably chlorine, or are a conjugated diene which is optionally substituted with one or more hydrocarbyl, tri(hydrocarbyl)silyl groups or hydrocarbyl, tri(hydrocarbyl)silylhydrocarbyl groups, said diene having up to 30 atoms not counting hydrogen;

R^5 and R^6 are identical or different, preferably identical, are one of a hydrogen atom, a halogen atom, preferably a fluorine, chlorine or bromine atom, a C_1 - C_{10} alkyl group, preferably a C_1 - C_4 alkyl group, which may be halogenated, a C_6 - C_{10} aryl group, which may be halogenated, preferably a C_6 - C_8

aryl group, a C₂-C₁₀ alkenyl group, preferably a C₂-C₄ alkenyl group, a C₇-C₄₀ arylalkyl group, preferably a C₇-C₁₀ arylalkyl group, a C₇-C₄₀ alkylaryl group, preferably a C₇-C₁₂ alkylaryl group, a C₈-C₄₀ arylalkenyl group, preferably a C₈-C₁₂ arylalkenyl group, a NR₂¹⁵, SR¹⁵, OR¹⁵, OSiR₃¹⁵ or PR₂¹⁵ radical, wherein: R¹⁵ is one of a halogen atom, preferably a chlorine atom, a C₁-C₁₀ alkyl group, preferably a C₁-C₃ alkyl group, or a C₆-C₁₀ aryl group, preferably a C₆-C₉ aryl group;

.....R⁷ is



wherein:

R¹⁷ to R²⁴ are as defined for R¹ and R², one of a hydrogen atom, a C₁-C₁₀ alkyl group, a C₁-C₁₀ alkoxy group, a C₆-C₁₀ aryl group, a C₆-C₁₀ aryloxy group, a C₂-C₁₀ alkenyl group, a C₇-C₄₀ arylalkyl group, a C₇-C₄₀ alkylaryl group, a C₈-C₄₀ arylalkenyl group, or a halogen atom, or are a conjugated diene which is optionally substituted with one or more hydrocarbyl, tri(hydrocarbyl)silyl groups or hydrocarbyl, tri(hydrocarbyl)silylhydrocarbyl groups, said diene having up to 30 atoms not counting hydrogen;

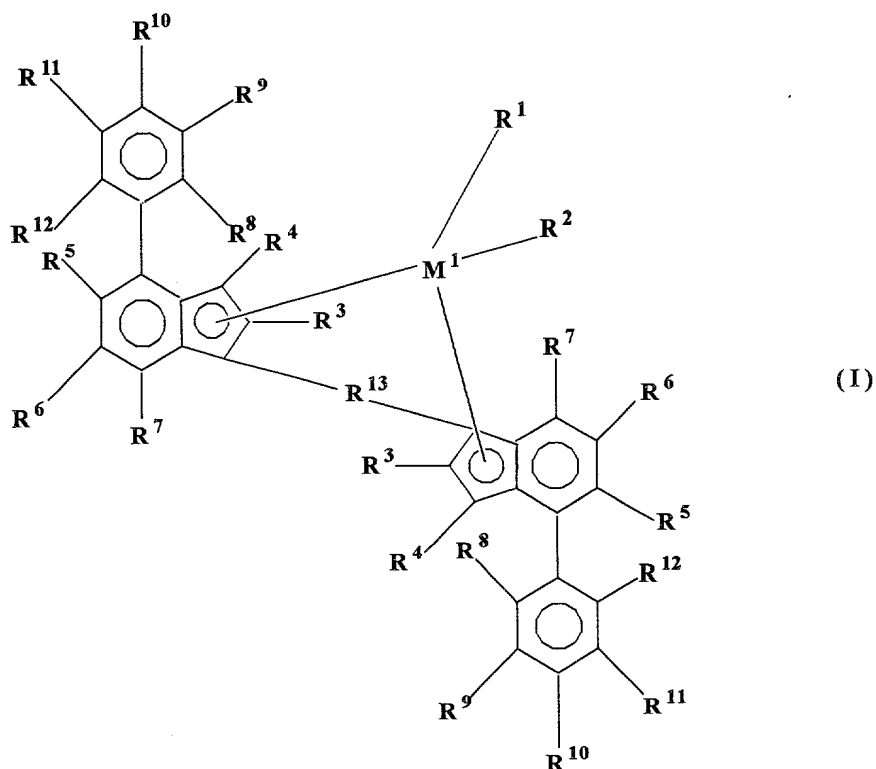
or two or more adjacent radicals R¹⁷ to R²⁴, including R²⁰ and R²¹, together with the atoms connecting them form one or more rings; and

M² is carbon, silicon, germanium or tin;

the radicals R³, R⁴, and R¹⁰ are identical or different and have the meanings stated for R⁵ and R⁶. Two adjacent R¹⁰ radicals can be joined together to form a ring system, preferably a ring system containing from about 4-6 carbon atoms.

.....Alkyl refers to straight or branched chain substituents. Halogen (halogenated) refers to fluorine, chlorine, bromine or iodine atoms, preferably fluorine or chlorine.

The metallocene compositions may also be represented by the formula:



wherein: M^1 is selected from the group consisting of titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum and tungsten, preferably zirconium, hafnium or titanium, most preferably zirconium;

R^1 and R^2 are identical or different, and are one of a hydrogen atom, a C_1 - C_{10} alkyl group, a C_1 - C_{10} alkoxy group, a C_6 - C_{10} aryl group, a C_6 - C_{10} aryloxy group, a C_2 - C_{10} alkenyl group, a C_2 - C_{40} alkenyl group, a C_7 - C_{40} arylalkyl group, a C_7 - C_{40} alkylaryl group, a C_8 - C_{40} arylalkenyl group, an OH group or a halogen atom, or are a conjugated diene which is optionally substituted with one or more hydrocarbyl, tri(hydrocarbyl)silyl groups or hydrocarbyl, tri(hydrocarbyl)silylhydrocarbyl groups, said diene having up to 30 atoms not counting hydrogen;

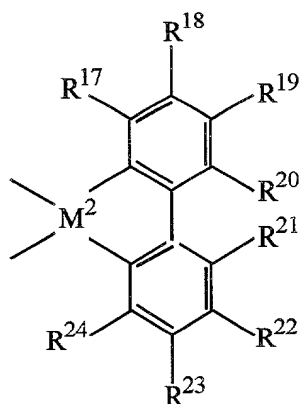
preferably R^1 and R^2 are identical and are a C_1 - C_3 alkyl or alkoxy group, a C_6 - C_8 aryl or aryloxy group, a C_2 - C_4 alkenyl group, a C_7 - C_{10} arylalkyl group, a C_7 - C_{12} alkylaryl group, or a halogen atom, preferably chlorine;

R^3 are identical or different and are each a hydrogen atom, a halogen atom, a C_1 - C_{10} alkyl group which may be halogenated, a C_6 - C_{10} aryl group which may be halogenated, a C_2 - C_{10} alkenyl group, a C_7 - C_{40} arylalkyl group, a C_7 - C_{40} alkylaryl group, a C_8 - C_{40} arylalkenyl group, a NR'_2 , SR' , OR' ,

OSiR^1_3 or PR^1_2 radical, wherein: R^1 is one of a halogen atom, a $\text{C}_1\text{-C}_{10}$ alkyl group, or a $\text{C}_6\text{-C}_{10}$ aryl group; preferably R^3 is not a hydrogen atom;

preferably each R^3 is identical and is a fluorine, chlorine or bromine atom, a $\text{C}_1\text{-C}_4$ alkyl group which may be halogenated, a $\text{C}_6\text{-C}_8$ aryl group which may be halogenated, a NR^1_2 , SR^1 , OR^1 , OSiR^1_3 or PR^1_2 radical, wherein: R^1 is one of a chlorine atom, a $\text{C}_1\text{-C}_4$ alkyl group, or a $\text{C}_6\text{-C}_8$ aryl group;

R^{13} is represented by the formula:



wherein: R^{17} to R^{24} are as defined for R^1 and R^2 ; or two or more adjacent radicals R^{17} to R^{24} , including R^{20} and R^{21} , together with the atoms connecting them form one or more rings; preferably, R^{17} to R^{24} are hydrogen.

M^2 is carbon, silicon, germanium or tin, preferably silicon;

R^8 , R^9 , R^{10} , R^{11} and R^{12} are identical or different and have the meanings stated for R^4 to R^7 .